Computer Engineering and Intelligent Systems
ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online)
Vol.9, No.2, 2018
www.iiste.org

Online Framework for Mobile Number Porting

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Abstract
Mobile Number Portability (MNP) has become a house while name in the mobile communication industry since its objective is to allow users to migrate from one network to another without having to change their sim cards. This is a welcome development since it further strengthens best practices and quality of service among key players in the industry. The process of sim porting has remained manual since it was introduced in Nigerian in 2013. This paper presents the design of online framework that will fast track the process of sim porting. The model of the proposed system has been developed, from which the application was eventually developed. The application was deployed and tested on smart phones running Android operating system.
Keywords: Mobile Number Portability; GSM; Framework; Model; Smart Phone; Android.

1. Introduction

Communication in our modern world has revolutionized since advent of mobile telecommunication. Both organizations and individuals have switched from the other means of communication to join the global communities in this trend. This is not unconnected with its ability to make an unimaginable coverage across the globe. So much trust have been bestowed on the use of this technology.

However, while many nations of the world enjoy an uninterrupted service derivable from the technology, since 2001 when this technology was introduce in Nigeria, subscribers have suffered many hiccups, ranging from low network coverage, irregular call charges, unfriendly customer service, poor Quality of Service (QoS) and many more. Giving more licenses to service providers have only solved part of the problem initiated by monopoly, at least users may have the choice of switching from one service provider to another. Subsequently, in 2013 Mobile Number Portability (MNP) was introduced in 2013 (Philips Consulting, 2013). The MNP scheme is a telecommunications service that grants mobile phone users the freedom of changing GSM operators while still retaining their original mobile phone numbers. In other words, a subscriber will not lose his or her mobile phone number should they decide to move from one network provider to another.

It has been identified that MNP demand physical presence of the subscriber wishing to port his/her number. This situation not only waists useful man hours, which will be spent in the process of going to the office of the service provider, it also create redundancy of task as a personnel must be ready to attend to the customer. This situation has a retarding effect on the objectives of implementing MNP. This is because if for any reason a subscriber is unable to make himself physically present for any reason, the scheme will not attain its objective if such a situation multiply itself over a large number of the population.

With the presence of ICT and the internet today, a web portal that will be managed by NCC and service providers to enable subscriber to process the request of porting by themselves will go a long way to solving the above mentioned problem. This is the focus of this thesis.

This paper is aimed at developing an improved portability framework for mobile networks in Nigeria by creating a web based front end interactions of the porting procedure using recent web development technologies.

2. Related Works

According to Philips Consulting, the level of awareness of the Nigerian market on MNP services and the key factors influencing the subscriber's decision to stay with, or leave their current GSM operators, there is a minimal correlation between reasons for switching and reasons for choosing a new operator and Qos was key factor that informed porting. This report shows that Nigerians are aware of this porting scheme.

Nnochiri.U.I et al, (2014) described the routing mechanism for Signalling Transfer Point migration for smooth call traffic flow Mobile Number Portability. Factors such as cost, convenience, simplicity, speed, reliability and robustness were properly assessed to ensure that the administrative process that is implemented does not adversely affect the success of mobile number portability.

Neeraj .J, (2013), a technical aspect of MNP which relates to call routing or mobile messages to a number once it has been ported was investigated on. This technical aspect of MNP implementation especially the changes in routing mechanism for smooth call traffic flow was basically described.

Suwan .D et al, (2014), the authors described the various number portability routing schemes namely, All Call Query, Query on Release, Call Dropback and Onward routing. The comparative analysis between these routing schemes on various parameters was presented while discussing the issues pertaining to NP.

Ajit .S, et al, (2013), the authors described the various parameters that could affect subscribers and the

parameters on which MNP depends. MNP decision making was addressed using fuzzy logic.

Richa .B, et al (2013) explained that Mobile Numbers are ported by configuring the LRN (Location Route Number) in the STP. The practical approach to assign a LRN for a number in the network is described in their work.

Suresh A.S, (2011) focused on the implementation, evaluation and effects of MNP on various service providers in Indian markets. Various aspects such as portability rate, charges, benefits of MNP to customers and telecom service providers, prospective effects of MNP on telecom subscribers, MNP portability report, suggestions for telecom service providers etc were presented.

The foregoing shows that numerous works have been done in this area of focus, but none have taken into consideration the need to have flexible interface to aid the user or subscriber to be able to port their numbers from the comfort of their home using today's internet technology. Hence, this paper intends to address this gap.

3. Methodology

In the design of the MNP, the waterfall and Object Oriented Programming (OOP) methodologies were adopted. While the waterfall was used for step by step identification of system requirement at the conceptual level, the actual system development was carried using OOP.

First the existing system was analyzed to properly understand the working principles of number porting. This analysis was presented as a process flow chart as shown below in figure 1.

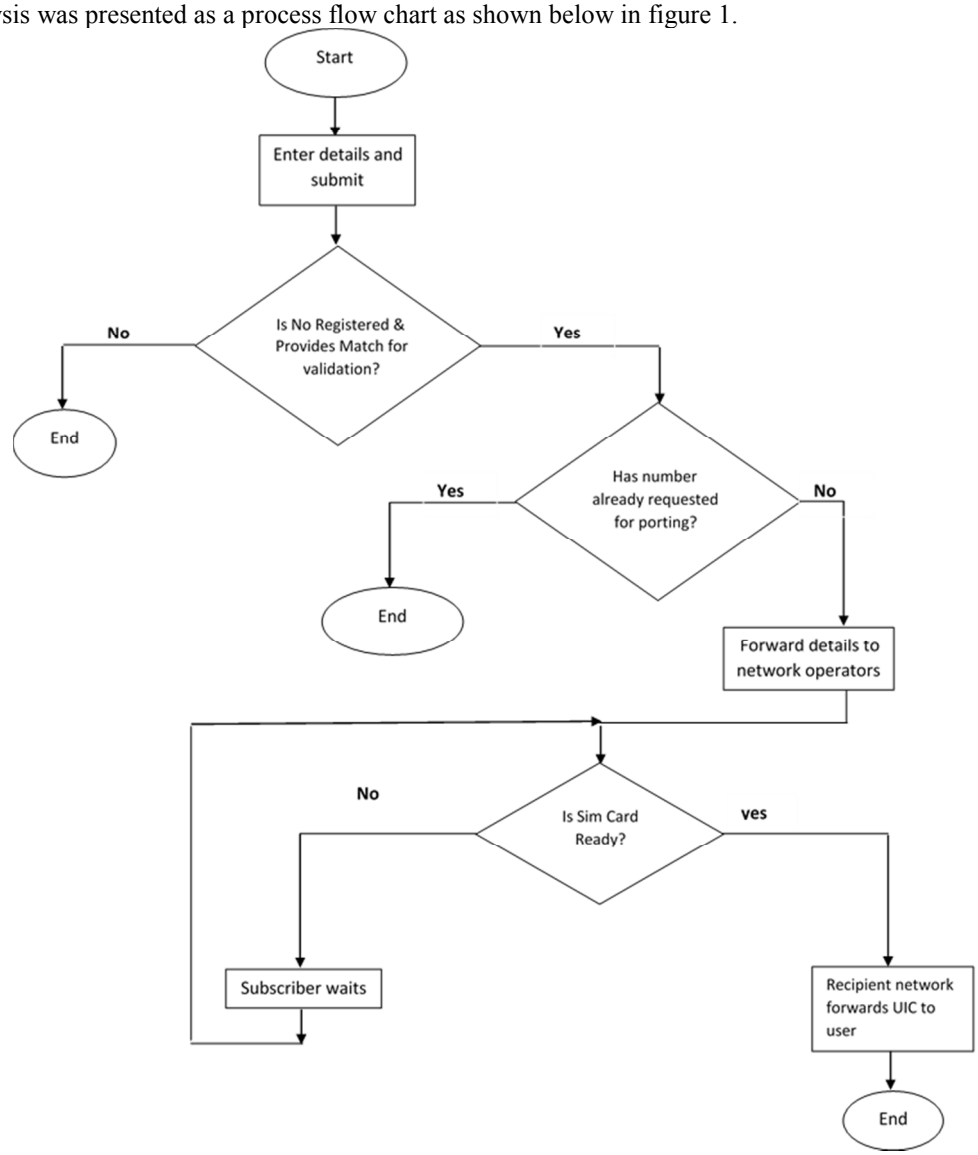

Figure 1 Process Flow Chart

Before the actual system design, the conceptual model of the system was presented in the block diagram of figure 2 shown below.

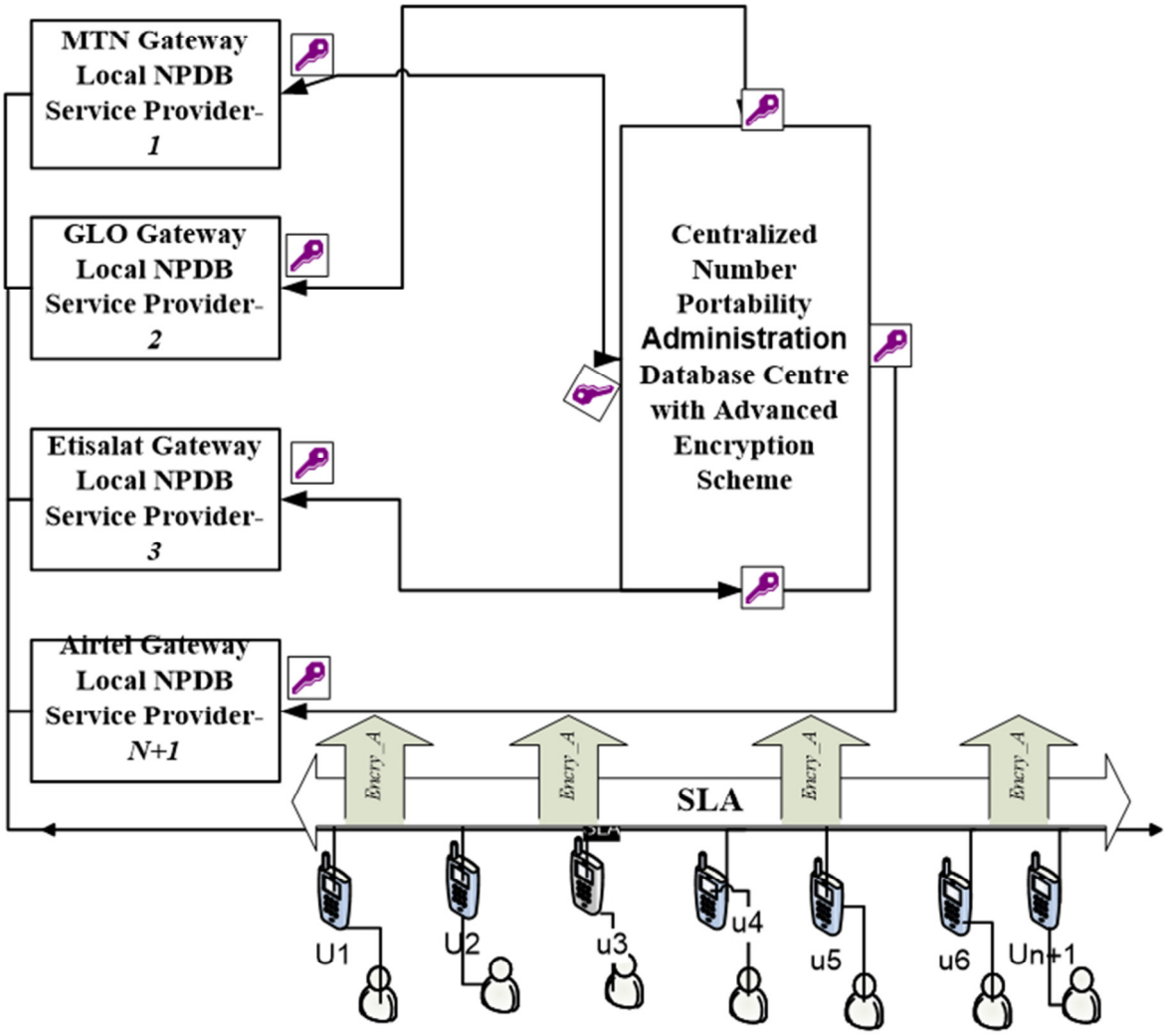

Figure 2 Block System Block Diagram

The block diagram of figure 1 shows how the various GSM service providers are mapped to a central database. These are represented as N1, N2, N3, Nn+1.

The actual design used OOP modelling tools. These tools include the Use Case Diagram, activity diagram and the class diagram. These tools were used to model the user interaction with the system, the interaction of different modules and the model of the database interaction.

3.1 Use Case Diagram

The model shows the interaction of different actors or users of the system with their levels of operation. Here, all the tasks are represented with oval shapes within another big oval shape known as environment. The environment represents the entire sample space for the task the system would be capable of doing. The subscriber can perform log in, submit request to port number and view reports from the server end. The admin has the duty to perform all task except submission of request.

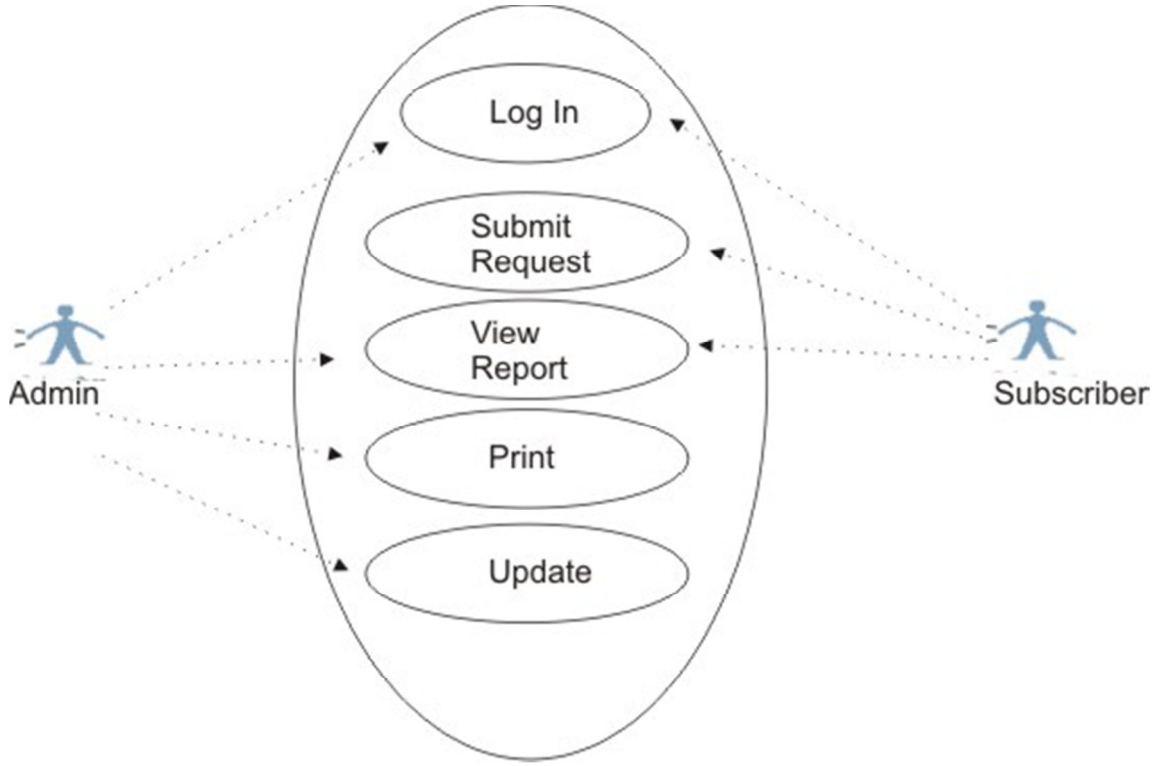

Figure 3 Class diagram of the System

3.2 Activity Diagram

This design model illustrates the relationship between each activity levels for both admin and subscriber. Figure 4 shows that both have to log in to use the system. The specific task by each then fooled different branches in the model.

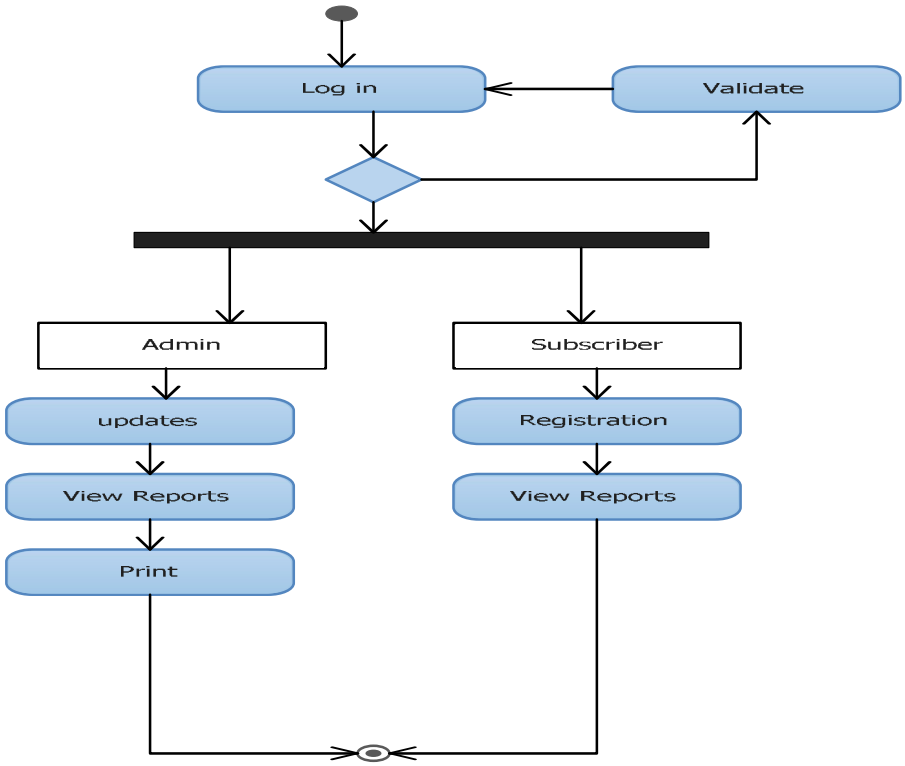

Figure 4 Activity Diagram

3.3 Class Diagram

The class model is a design of the database structure for the management of the information expected to be generated during the use of this system. Three main components are shown in the model with their data attributes, including Admin, Process and Subscriber. The level of relationships that exist between each object are also shown.

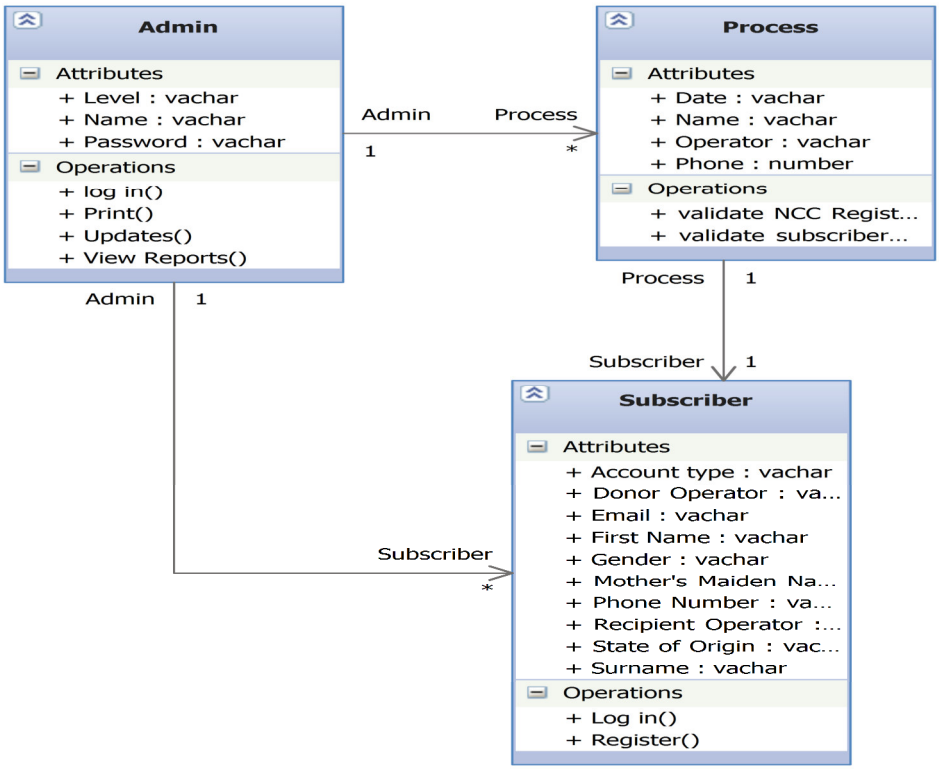

Figure 5 Model of the Class Diagram

3.4 System Architecture

The architectural design of the system is such that there is a front end application running on the mobile phone, which was implemented using web technology, involving HTML, CSS, Javascript and PHP. There is also a backend, which consist of the server side, running most query requirements. This was implemented using MySQL. This structure represents a three tier architecture.

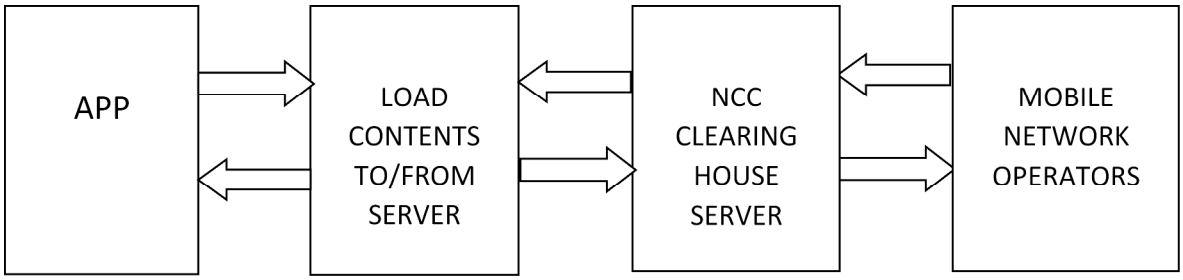

Figure 6 3 tier Architecture

4. Result and Discussion

This application was developed and deployed of different GSM phones (Techno Y3, Huawei Y600, Samsung Galaxy, Gionee p2 and Itel H5) running Android operating system of the following versions:

- Version 3.0 (Honeycomb)
- Version 4.0 (Ice cream sandwich)
- Version 4.1 (Jellybean)
- Version 4.4 (Kitkat)
- Version 5.0 (Lollipop)

The installation on all these versions went successfully and the application loaded to the home page in

figure 7 below.

Figure 7 Application Home page

The following screen short were also capture during the test phase of the application.

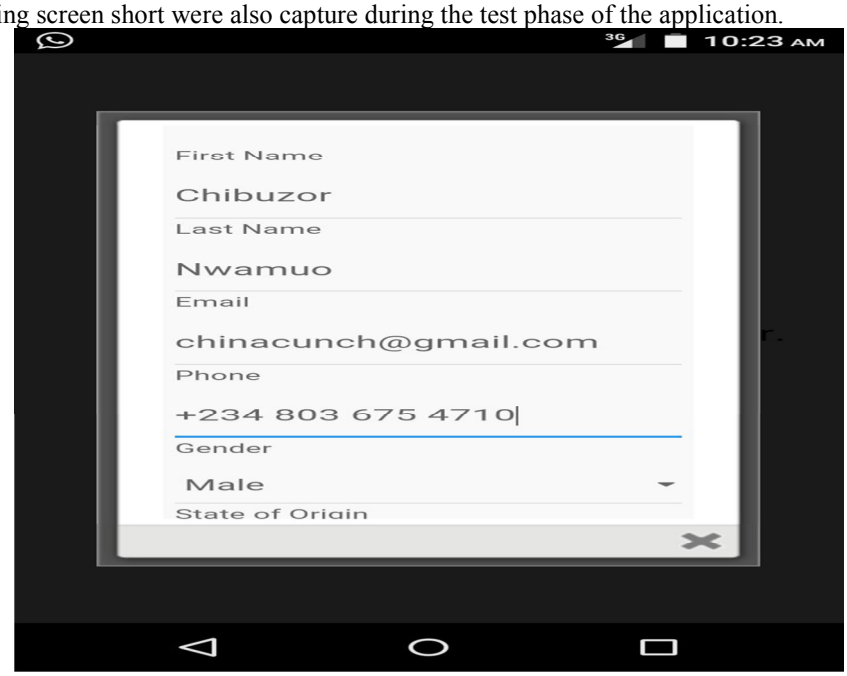

Figure 8 a Application Form screenshot Page 1

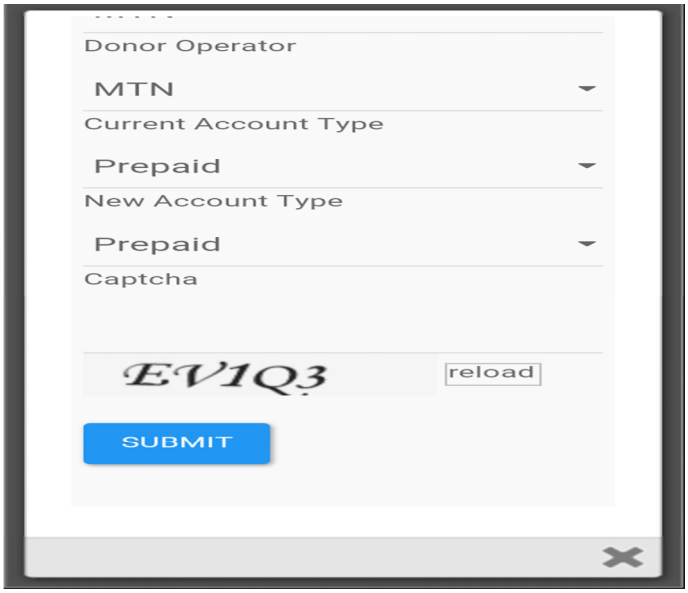

Figure 8 b Application Form screenshot Page 2

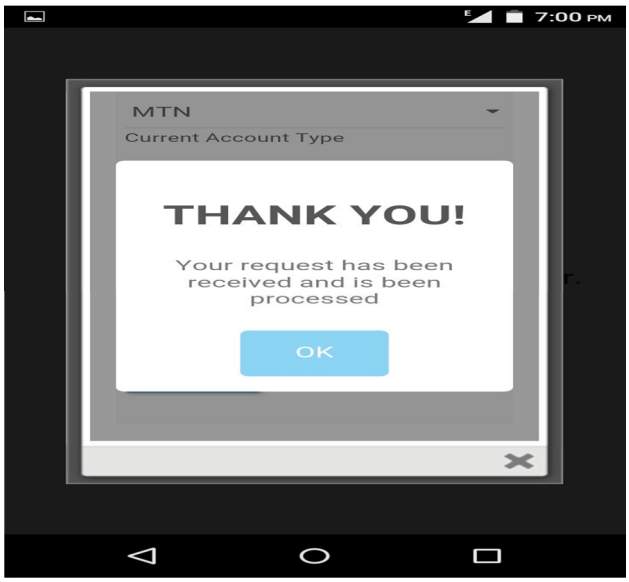

Figure 9 Feedback Page

5. Conclusion

Objective measurement of MNP is the focus of service quality in mobile cellular networks. MNP QoS has being a very difficult issue confronting the major key players in the industry. This is because of the uniqueness of QoS metrics. However, the distinguishing characteristics for MNP evaluation must tend towards two major ends: a credible and reliable assessment of the likelihood that users will find a network particular service satisfactory; and the determination on how system performance could be changed when that assessment shows that users are not likely to be satisfied. For this purpose, MNP has been proposed and is expected to be the main engine for QoS management in the next generation networks

This thesis presents a framework for MNP using a Sim port application kit as an improved system over the existing system. This was developed to replace the existing packet and circuit strategy on MNP. The legacy MNP systems, operational procedures and characteristics were discussed. The various entities and the system modeling were articulated. In this work, the flowchart algorithm and system architectures were presented.

Consequently, this work shows that the Sim port application will enable a better network performance in a porting environment while satisfying the NCC requirements on porting.

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